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RESEARCH ARTICLE

**Microcredit Participation and Child Schooling in Rural Bangladesh:
Evidence from a Cross-Sectional Survey**

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Microcredit Participation and Child Schooling in Rural Bangladesh: Evidence from a Cross-Sectional Survey

Abstract

This paper investigates the impact of microcredit programs on child schooling in rural Bangladesh using cross-sectional data from 439 households across 20 villages of four districts of the country. A child's school outcomes are measured by school enrolment, school attendance and grade attainment (measured by the right grade for age). Our results reveal that participation in microcredit programs has a significant positive effect on school attendance but no effect on either school enrolment or grade attainment, suggesting that care should be taken in assessing the effectiveness of microcredit programs. Despite the fact that microcredit programs can alleviate poverty and contribute to the rural economy, these can also result in unintended consequences such as adverse effects on children's schooling. Policies aiming to improve the children's educational achievement in rural households should consider providing or enhancing subsidized educational stationery and meals besides providing free universal education among the children of microcredit participants.

Keywords: Microcredit, Bangladesh, child schooling, cross-sectional survey.

JEL Classification: I21, I31, L30, O12, R20

1. Introduction

Microcredit operations have expanded rapidly in recent decades in the developing world. They have reached more than 30 million borrowers in Bangladesh, which represents 60% of the country's poor households (World Bank 2012). A microcredit generated credit program delivers collateral-free low-interest credit, unlike that of moneylenders, to poor people to encourage entrepreneurship and stimulate economic growth (Chepsat, Obara & Makindi 2014). Additionally, microcredit can be a powerful vehicle for giving the poor more economic options as well as non-economic options such as health and education programs. Preferably, the poor would have access to a coordinated blend of microcredit and other development services to improve the education of children (Dunford 2002) and the health care services of the participants (Bhuiya, Khanam, Rahman and Nghiem, 2018). Now the question is how to maintain a coordinated combination of development services in rural areas where multiple services are simply unavailable.

Microcredit experts are sometimes motivated to deliver non-financial services such as health and education to their clients, considering the demand for them. However, because non-financial service organizations can provide the same services to these same clients the financial viability of microcredit institutions (MFIs) as business concerns has made the experts very cautious about add-ons such as non-financial services.. Moreover, most MFIs feel comfortable with concentrating only on the financial needs of their clients rather than attempting to meet their non-financial needs. On the other hand, some of the MFIs run primary schools in communities where there is no formal education system through complementing mainstream school systems with innovative teaching methods and materials (BRAC, 2015).

Education, particularly child education, is a crucial element in the alleviation of poverty and for economic growth at the macro level as well as on the household level (Quaegebeur & Marthi 2005). However, despite the interest of poor households in sending their children to school, they are hindered by a number of constraints. Among the major constraints, affordability is one of the important factors as most of the clients do not have enough funds to pay for the costs involved with schooling. Although there are no tuition fees charged, other indirect costs such as uniforms, stationery and transportation are involved in the process. In this situation, MFI initiatives can indirectly support child education by providing families with income stability and hence enable them to afford schooling costs (Barnes, Gaile & Kimbombo 2001). Theoretically, income generated due to participation in microcredit programs should result in higher spending on schooling (Brownstein et al. 2007), so it is expected that microcredit membership should have a positive effect on child schooling. However, although some studies have investigated the impact of microcredit on the affordability of education, very few studies have examined the effect of microcredit participation on child schooling and considered the potential endogeneity issues of microcredit participation and child schooling. Considering this fact, we are inspired to explore the effects of microcredit on child schooling to fill up the gap in the literature. As the unobserved parental characteristics affect both microcredit participation and child schooling, therefore, it is likely that microcredit participation is endogenous. We address the endogeneity issue in this paper using a propensity score matching approach and the approach of Altonji et al. (2005), and thus, we make a significant contribution to the existing literature.

The rest of the article is organized as follows: Section two presents a brief review of literature; Section three describes the conceptual framework, study area, sample selection,

data sources and descriptive statistics; Section four specifies the econometric models; and results are discussed in Section five. After that, a conclusion is drawn in the final section.

2. Brief Review of Literature

A significant number of studies have examined the impacts of microcredit on education. The evidence from these studies is conflicting, signifying both positive and negative impacts. It is evident from some studies that participating in microcredit programs contributes to the increase in the household's expenditure on children's education (Adjei et al. 2009; Lacalle Calderon et al. 2008). However, Brannen (2010) and Gubert and Roubaud (2011) found no such effect. Nanor (2008) found that contradictory impacts on spending on education depend on the region, suggesting that the relationship between microcredit and education are influenced by other factors. Among the four studies conducted, two studies showed that microcredit was associated with dropping out of school among the children of microcredit participants. Another study conducted in Malawi showed that access to microcredit significantly decreased primary school attendance among the children of the borrowers (Shimamura & Lastarria-Cornhiel 2010). Moreover, data suggested that the duration of time with the credit program did not indicate positive impacts on spending on education and decreased children's enrolment (Adjei, Arun & Hossain 2009).

Another study in Bolivia based on two household surveys conducted by Maldonado and González-Vega (2008) mentioned that microcredit had a significant impact on child schooling of the clients. This study found that the schooling gap was less for established clients compared to new clients. On the other hand, a recent study conducted by Islam and Choe (2013) indicated that participation of households in microcredit programs had adversely affected children's schooling, especially girls' schooling. In contrast, Littlefield, Morduch and Hashemi (2003) found that poor people used the income generated from

microenterprise activities for their children's schooling. Most of the earlier studies showed that children of microcredit clients tended to go to school and continued school for a longer period than children of non-clients.

Another line of literature has investigated the trade-off between child labour and schooling (see, for example, Amin, Quayes and Rives (2006); Khanam (2008); Khanam and Ross (2011)) or between child malnutrition and schooling by using household surveys in a specific country. Amin, Quayes and Rives (2006) investigated whether both market work and household work deterred schooling in Bangladesh. Ravallion and Wodon (2000) and Khanam and Ross (2011) examined whether child labour displaced schooling in Bangladesh. Khanam, Nghiem and Rahman (2011) examined the impact of childhood malnutrition on schooling performance in rural Bangladesh and found that malnourished children were more likely to enrol late in school and fall behind in grade achievement. Despite the numerous studies on schooling, very few have investigated the effects of microcredit on child schooling addressing the issue of endogeneity of microcredit participation. Thus, our study will contribute to the line of literature by examining the effects of microcredit participation on child schooling.

3. Methodology, Data and Sampling

3.1 Conceptual Framework

The relationship between microcredit and child schooling can be explained by employing the household production model previously used by Becker (1965), Becker and Lewis (1974) and Taylor and Adelman (2003). The model asserts that households are assumed to maximize their utility within their time and budget limit. Households get utility from the consumption of goods and services and the enjoyment of leisure activities. The income can be generated by households from productive activities either from wage employment or

work on the family farm. Thus, households aim to achieve the highest level of utility by allocating a fixed time constraint among production, consumption and leisure (Khanam, Nghiem & Rahman 2011).

Education is one of the examples of services that households consume. Households get higher utility from the good schooling performance of their children. To achieve this outcome, they have to allocate some household resources towards education for their children (e.g., meals, school dress and stationery). Apart from common determinants such as budget limitation and other exogenous characteristics, the amount of resources that households allocate to the education of their children is decided by unobservable characteristics such as risk attitude, preferences, and entrepreneurship skills. The relationship can be expressed as

$$U = f(S, F, C, L, X, \xi) \dots \dots \dots (1)$$

where S is the schooling performance of the children of household members, F is food consumption, C is non-food consumption, L is leisure, X is exogenous household characteristics, and ξ is a stochastic error term representing unobservable heterogeneity in preferences. This study, however, only measures one of the implications of household production model, which is hypothesized as (H_0): there is no significant impact of microcredit participation on children's school attendance of the rural households of Bangladesh in the context of microcredit program (among member households).

3.2 Data, Study Area and Sample Selection

This paper is based on a household survey conducted by the authors from April to July 2014 in four districts of Bangladesh. These districts were selected for the field survey using the main criterion that there must be microcredit institutions (MFIs) with clear eligibility criteria operating in the district. We plan to use these eligibility criteria to sample

control households (those with similar characteristics but have not received microcredit services). Three NGOs were selected by applying a purposive sampling technique. The Development Initiative for Social Advancement (DISA) was chosen purposively because the organization received the first national promising MFIs award in the year 2009 from the Palli Karma-Sahayak Foundation (PKSF). The Grameen Bank (GB) and the Bangladesh Rural Advancement Committee (BRAC) were selected as they were the largest and most renowned MFIs in Bangladesh.

In the survey, member-households were sampled from a list of microcredit members in each village. For non-member households, the sample frame consisted of households owning less than half an acre of land and ranked as poor by village heads. It was planned to select 25 households per village. However, some households could not be found or had no adult at home and hence could not be interviewed. Thus, the total number of households interviewed was 439, or about 22 households per village.

Two sets of pre-tested structured questionnaires were administered to the sampled households. The first questionnaire was related to selected villages which gathered data on the profile of the villages regarding their location, resources and infrastructure using key informant interviews with village leaders, union officials, community leaders and microcredit officials. The second questionnaire, involving information on the general demographic and socioeconomic data used in analysis, was furnished by the head of the household. Specific information on recent child schooling and related accessibility to educational facilities was provided by the spouse of the household head (usually the women member of microcredit) or any knowledgeable adult household member present at the time of the survey. The data on gender (male or female), literacy (primary, secondary, higher or no education), occupation of the household head including spouse and household's landholding status were collected. The occupation was defined as the activity in which the

household head spent the major part of the working day and was categorized as labour-selling or non-labour-selling, depending on whether the household must depend on selling manual labour for at least 100 days a year for survival. Labour selling households tended to be of lower socioeconomic status, given their dependence on variable seasonal employment. Land ownership was determined by asking the household to identify all land in their possession for which 'no one except the Government could take away their rights to usage'.

We also asked questions of households regarding the performance measure of a child in schooling. For example, parents were asked to answer a question, "When did the child start school?" "In which grade are they now?" "What is the performance of the child according to their teacher?" Their responses were measured by a five-point Likert scale, where 1=top 5%, 2= top 10%, 3= top 20%, 4= top 30% and 5=others. Moreover, to identify the regularity and drop out rate of the child, we asked the questions 'Had their child repeated class?' 'How many days did they miss class last year?'

3.3 Measurement of Variables

Outcome Variables

Child schooling is examined by three binary measures: (1) school attendance (equals one if the child is attending school), (2) school enrolment (equals one if the child is enrolled at school at 6 years of age), and (3) grade attainment (equals one if the child achieves the right grade at his/her right age).

Independent Variables

We used the duration of microcredit membership to examine the impact of microcredit on child schooling. In addition, three groups of exogenous variables (individual variables, household variables, and community variables) were used to control the relationship between microcredit and school performance. The details of the independent variables are mentioned below.

- **Individual characteristics:** These variables refer to the characteristics of each child that were expected to influence educational achievements. The main variables that represent child characteristics are the age and gender of the child.
- **Household characteristics:** At the household level, information on wealth level (proxied by the logarithm of household income), household size, education level of parents, occupation, type of employment, dependency ratio, shock (measured by loss of crop, business failure or sickness, etc.) and ethnic minority status were included. It is expected that children from wealthier households are more likely to have better schooling due to the ability of their parents to afford costs of schooling and other expenses. The effect of household size is expected to be negative on child schooling, as a larger family will deplete the household's resources.
- **Community characteristics:** The community variables were selected to represent basic infrastructure for education, such as the availability of NGO operated schools, girl-only secondary schools, distance to the nearest schools, casual labour wages, wheat prices, illiteracy rate, and distance to the nearest health complex.

3.4 Descriptive statistics

The mean of the main variables separated by microcredit membership is presented in Table 1, which shows no systematic differences between microcredit members and non-members, with few exceptions. For example, children of microcredit members have a higher rate of school attendance (97% vs 88%) and the household sizes of member families are slightly larger (5.1 vs 4.7) than non-member households. A notable difference is that microcredit member households are more likely to face a shock (e.g., loss of crop, business failure or sickness) in the past 12 months (33% vs 17%) compared to non-member

households. The similarity in observable variables in Table 1 suggests that selection bias may not be a serious issue in this sample.

Table 1: Descriptive Statistics (Means by microcredit status)

<i>Variables</i>	All	Non-MF	MF	p-value
<i>Outcome Variables</i>				
Currently attending school (1= yes)	0.96	0.88	0.97	0.00
Enrolled at school at the due age (1= yes)	0.82	0.81	0.82	0.82
Right grade-for-age (1= yes)	0.62	0.58	0.63	0.36
<i>Individual/household covariates</i>				
MF members	0.85	-	-	-
Child age (years)	8.76	8.55	8.80	0.49
Child gender (male=1)	0.51	0.50	0.51	0.74
Age of household head (years)	39.45	38.69	39.58	0.22
Ethnic minority (1=yes)	0.10	0.07	0.10	0.29
Gender of household head (1=male)	0.99	0.98	0.99	0.19
Education of household head (1= Primary school)	0.74	0.71	0.75	0.34
Education of spouse (1=Primary school)	0.71	0.74	0.71	0.43
Occupation of household head (1=low-skill labour)	0.44	0.54	0.42	0.02
Type of employment (1=full time)	0.76	0.76	0.76	0.86
Number of people in the family	5.04	4.69	5.1	0.00
Number of people in labour age	2.61	2.46	2.64	0.05
Log of income per adult-equivalent	11.33	11.28	11.33	0.32
Shocks in past 12 months	0.31	0.17	0.33	0.00
<i>Village covariates</i>				
Illiteracy rate (%)	18.95	18.69	18.99	0.79
Distance from nearest health complex (km)	11.73	9.66	12.1	0.31
Distance from nearest school (km)	1.34	1.39	1.33	0.53
Wheat price (BDT [±])	23.39	23.26	23.41	0.8
Casual labour wage (BDT)	301.88	301.77	301.9	0.98
Access to Education: NGO operated school (yes=1)	0.29	0.27	0.30	0.48
Access to Education: Secondary school girls only (yes=1)	0.24	0.23	0.24	0.75
Access to Education: Secondary school boys only (yes=1)	0.24	0.23	0.24	0.75
Access to Education: Secondary school mixed (yes=1)	0.14	0.1	0.15	0.18
Access to Education: Upper secondary school (yes=1)	0.24	0.23	0.24	0.75
Access to Education: Mosque schools (yes=1)	0.24	0.14	0.14	0.94

Source: Authors' calculations based on Field Survey, 2014. [±] BDT = Bangladesh Taka

Regarding the means of selected variables, 96% of the children in the sample are currently attending school with 82% enrolled by the due age and 62% of the children

attained the right grade for age. The sample also shows that the average age of the children of the member households is 8.76 years, while 51% of children in the sample are boys.

Regarding household characteristics, 99% of households are headed by males with an average age of 39 years. Additionally, 74% of household heads attained only primary school level, whereas the respective figure of their spouses is 71%. The average household size is 5, and the average number of working-age household members is 3. Among the households surveyed, 10% of households were from an ethnic minority. It should be further noted that 44% of the households have members whose occupations are unskilled (e.g., subsistence farmer or low-skilled labourer) and 76% of the households have members in full-time employment.

Table 1 also shows that on average, the illiteracy rate in the village is 19%. The average distance to the nearest health complex and nearest school from the village is 12 km and 1.34 km, respectively. Moreover, the educational facilities offered in the villages surveyed is. Only 29% of the villages have an NGO operated school, while the availability of girls' secondary schools in the village is 24%. Further, financial assets are low; the average wheat price is 23 BDT/kg, and the casual labour wage is 302 BDT/day in the surveyed villages.

4. Econometric Specification

Based on Islam and Choe (2013); Edmonds (2006) and Ravallion and Wodon (2000), the impact of participation in microcredit programs on child schooling can be estimated with the following equation:

$$S_{ijk} = \beta_0 + \beta_1 X_{ijk} + \beta_2 Y_j + \beta_3 V_k + \beta_4 D_j + \lambda_{ij} + \varepsilon_{ijk} \dots \dots \dots (2)$$

where:

- S_{ijk} is the dummy variable representing the selected education outcomes (e.g., school attendance, enrolment at due time, and the right grade-for-age status) of the child i in household j for village k ;
 - D_j is the dummy variable representing the microcredit membership;
 - X_i is the child characteristics;
 - Y_j is the household characteristics;
 - V_k is the set of village characteristics;
 - λ_{ij} is unobserved individual/household effects (attitude toward risks, entrepreneurial skills);
- ε_{ijk} is the idiosyncratic error term; and
- $\beta_1, \beta_2, \beta_3, \beta_4$ are parameters to be estimated.

To compute the most commonly used type of educational achievement, Patrinos and Psacharopoulos (1997), Khanam and Ross (2011), Khanam, Nghiem and Rahman (2011) defined a grade-for-age dependent variable as follows:

$$\text{Grade-for-age} = \begin{cases} 0 & \text{if Current grade} < \text{Expected grade} \\ 1 & \text{if Current grade} \geq \text{Expected grade} \end{cases}$$

where the expected grade is defined as the grade attainable from the school-entry age, which is six years old in Bangladesh. The other two dependent variables are school attendance (equals 1 if the child i attends school, and 0 otherwise) and school enrolment (equals 1 if the child is enrolled at school at 6 years of age, and 0 otherwise). Since the dependent variables are coded as binary, we chose binary logit regressions to estimate Equation 2.

Despite the similarity of observable characteristics by microcredit status (see Table 1), the main issue with estimating Equation (2) is the self-selection bias caused by the unobserved

family characteristics that affect both the decision to join a microcredit program and the schooling of children. A powerful and popular choice to address this issue is the instrumental variable approach. However, finding a good instrumental variable is challenging, and unfortunately, we did not have any good instrumental variable in this data set. Thus, we selected a propensity score matching approach as an alternative to mitigate the self-selection issue. This approach generates predicted probability of treatment (i.e., become a member of a microcredit program) for both control (non-member households) and treatment (member households) groups using observable covariates (e.g., age, gender and ethnicity etc.). Effects of microcredit on outcomes of interest (i.e., child schooling) are then estimated by the differences in outcomes of households in the two groups with similar predicted treatment probability.

To further test the robustness of the findings from the standard logistic regression under the presence of unobserved family characteristics, we also applied the “selection on observables and unobservables” approach pioneered by Altonji, Elder and Taber (2005). This approach estimates an implied ratio of unobservable over observable such that treatment effects (e.g., microcredit parameters) will be explained. In particular, Altonji et al. (2005) estimate that bias caused by unobservable covariates as the difference between predicted residuals of treatment and control groups multiplied by the ratio of variance of observed and predicted outcome estimated under the assumption of no treatment effect. Thus, the implied ratio, defined as the ratio between the null parameter and the estimated bias will represent the relative effects of unobservable over observables to nullify the treatment effects. A large implied ratio suggests that the estimates are robust to unobservable covariates.

5. Results and Discussions

School attendance

The results from the logistic regression confirm the descriptive statistics in Table 1 that children of microcredit members have a significantly higher probability of attending schools but the magnitude of the difference is minimal at 2.2 percentage points (see marginal effects). The propensity score matching estimates produce a higher difference of 7 percentage points, which is also closer to the raw difference of 9 percentage points (i.e., 97 - 88) in Table 1. The estimated effects of microcredit on school attendance are also very robust to the presence of unobserved covariates. In particular, parameters of microcredit membership on school attendance can only be explained if the effects of unobserved covariates are 4.5 times higher than the effects of observable covariates used in the model.

The factors that are significantly associated with school attendance are child age, household size and literacy rate in the villages. It is not surprising that the probability of attending school increases with the age of the child. In addition, distance to the nearest schools is inversely related to the odds of attending school although this parameter is significant only at 10%. In contrast to expectations, the log of income has no significant effect on school attendance. Finally, the negative and significant effect of financial shock is not surprising in a country like Bangladesh as even small financial shocks may affect the affordability of schooling costs.

Table 2: The effects of microcredit participation on school attendance

Variables	Coeff.	Std. Err.	Marginal Effects
Member of microcredit	1.07***	0.35	0.022
Ethnic minority (yes=1)	-0.52	0.49	-0.006
Education of household head: Primary school	0.15	0.34	0.001
Spouse education: primary school	-0.67*	0.38	-0.003
Occupation	0.54	0.35	0.003
Household size	0.92***	0.21	0.006
People in labour age	-0.96***	0.23	-0.006
Log of income	0.19	0.24	0.001
Shocks in past 12 months (yes=1)	-0.78**	0.39	-0.008
Illiteracy rate (%)	-0.05*	0.03	0.000
How far is the nearest health complex?	0.01	0.02	0.000
Wheat price (BDT [±])	-0.10**	0.05	-0.001
Casual labour wage (BDT)	-0.03**	0.02	0.000
Distance to nearest school	-0.67*	0.35	-0.004
NGO operated school (1=yes)	-0.52	0.50	-0.005
Secondary school girls only (1=yes)	-1.25	0.95	-0.026
Child age (years)	0.15***	0.04	0.001
Child sex (boys=1)	-0.18	0.27	-0.001
Constant	11.23**	5.09	
Chi ²		97.49	
p-value		0.00	
Pseudo R2		0.447	
Propensity matching: treatment effects (SE)		0.075*** (0.028)	
Selections on unobservables and observables (implied ratio)		4.5	

Note: .01 = ***; .05 = **; .1 = *; [±]BDT = Bangladeshi Taka

School Enrolment

Our results show that being a member of a microcredit organisation has no significant effect on the probability of a child's enrolment. Child age has a significant negative effect on the probability of enrolment at the due time, which indicates that non-enrolment or late enrolment is more apparent at an older age. Among other household characteristics, the education of the household head seems to be the most influential driver of due enrolment. The probability of being able to enrol in school at the due age for the children of household heads with primary schooling is lower by 15.8 percentage points

compared to those with secondary or higher level of education. However, the positive effects of low-education mothers on due enrolment of children seem counter-intuitive.

Table 3: The effects of microcredit participation on school enrolment

Variables	Coeff.	Std. Err.	Marginal Effects
Member of microcredit	0.25	0.22	0.059
Ethnic minority (yes=1)	-0.16	0.32	-0.037
Education of household head: Primary school	-0.95***	0.25	-0.158
Spouse education: primary school	0.45**	0.19	0.109
Occupation	-0.12	0.18	-0.026
Household size	-0.19**	0.09	-0.041
People in labour age	-0.05	0.11	-0.012
Log of income	0.27*	0.16	0.059
Shocks in past 12 months (yes=1)	0.27	0.22	0.055
Illiteracy rate (%)	-0.01	0.01	-0.003
How far is the nearest health complex?	-0.01***	0.01	-0.003
Wheat price (BDT [‡])	-0.09***	0.02	-0.020
Casual labour wage (BDT)	0.01	0.01	0.001
Distance to nearest school	-0.53***	0.12	-0.116
NGO operated school (1=yes)	1.14***	0.32	0.165
Secondary school girls only (1=yes)	0.74**	0.34	0.130
Child age (years)	-0.05**	0.02	-0.012
Child sex (boys=1)	-0.12	0.15	-0.027
Constant	0.74	2.34	
Chi ²		140.03	
p-value		0.00	
Pseudo R2		0.282	
Propensity matching: treatment effects (SE)		0.01 (0.07)	
Selections on unobservables and observables (implied ratio)		1.5	

Note: .01 = ***; .05 = **; .1 = *; [‡]BDT = Bangladeshi Taka

Among the village characteristics, distance to the nearest school, wheat price show a significant negative effect on the probability of school enrolment at due time. The marginal effects show that the further distance to the nearest school by one km is associated with a reduction in the probability of due enrolment by 11.6 percentage point. Moreover, an increase in the wheat price in the village by one BDT is associated with a decrease in the probability of due enrolment by two percentage points. It is expected that in the communities

where better education infrastructure exists, parents will have a greater incentive to enrol their child on time because at least the indirect costs of sending children to school are lower.

Grade Attainment

Table 4 shows that microcredit membership has no significant effect on grade attainment (achieving the right grade for age). The propensity score matching predicts a positive effect of 13 percentage points but this estimate is not also significant. The implied ratio of 1.5 also suggests that any significant estimate for grade attainment can be explained away with unobserved covariates larger than observable by 50%.

Among the other child and household characteristics, the factors that are significantly associated with achieving the expected grade are the education level of the mother, child age, and household size. In particular, children of mothers with only primary education have lower probability of attaining the right grade by 19.2 percentage points. The village characteristics that are significantly associated with grade achievement at the right age are the distance to the nearest health complex, wheat price, and access to the NGO secondary school. However, the sign of these parameters seems counter-intuitive.

Table 4: The effects of microcredit participation on grade attainment (right grade for age)

Variables	Coeff.	Std. Err.	Marginal Effects
Member of microcredit	-0.16	0.17	-0.056
Ethnic minority (yes=1)	0.34	0.25	0.112
Education of household head: Primary school	0.31*	0.16	0.114
Spouse education: primary school	-0.59***	0.16	-0.192
Occupation	-0.25*	0.15	-0.090
Household size	0.46***	0.08	0.163
People in labour age	-0.59***	0.09	-0.211
Log of income	-0.09	0.12	-0.030
Shocks in past 12 months (yes=1)	0.0004	0.17	0.000
Illiteracy rate (%)	-0.02*	0.01	-0.006
How far is the nearest health complex?	0.02***	0.00	0.007
Wheat price (BDT)	0.07***	0.02	0.024
Casual labour wage (BDT [±])	-0.004	0.004	-0.002
Distance to nearest school	-0.05	0.10	-0.018

NGO operated school (1=yes)	-0.46**	0.23	-0.171
Secondary school girls only (1=yes)	0.11	0.25	0.038
Child age (years)	0.04**	0.02	0.014
Child sex (boys=1)	-0.02	0.12	-0.008
Constant	0.68	1.86	
Chi ²		114.02	
p-value		0.00	
Pseudo R2		0.169	
Propensity matching: treatment effects (SE)		0.13 (0.11)	
Selections on unobservables and observables (implied ratio)		1.5	

Note: .01 = ***, .05 = **, .1 = *; [‡]BDT = Bangladeshi Taka

6. Conclusions and policy implications

In this paper, we have examined the impact of microcredit membership on the educational attainment of the children of microcredit participants in four districts of Bangladesh. The study covers three measures of schooling: school attendance, school enrolment, and grade attainment. The results have revealed that microcredit participation has a significant positive impact on school attendance but no significant impact on other school outcomes. The possible explanation for no effect of microcredit on school enrolment and grade attainment is that microcredit increases demand for labour in household business set ups. As a result, children's time will be diverted away from school into household businesses. Overall, our results suggest that due care should be taken in assessing the effectiveness of microcredit programs. Despite the fact that microcredit programs can improve poverty and contribute to rural economy in the short run, they can also result in unintended consequences such as adverse effects on children's schooling, which could exacerbate poverty in the longer term. Our study contributes to the literature in the sense that it demonstrates that microcredit participation does not unequivocally lead to more schooling for children. Expenditure on education affects the formation of human capital, which becomes the most important asset for the poor in rural areas (Doan, Gibson & Holmes 2014).

We can suggest some policies to be adopted to mitigate the adverse effects on child schooling so that existing and future generations can benefit from microcredit programs. First, the gestation period between actual loan disbursement and the start of repayment can be extended. This finding will allow many participants to invest in suitable investment projects where they may find a greater balance between employing children in household businesses and sending them to school. Second, interest rate reduction and longer repayment periods can also help households to become less myopic. Third, extension in the size of credit creating employment of external labour can reduce the burden of child labour of households. The measures that are directed at microcredit organizations alone are by no means sufficient in reducing child labour and improving child schooling. Therefore, policies aiming at improving the children's educational achievement of rural households should consider enhancing or providing subsidized educational stationery or meals in addition to providing free universal education among the children of microcredit participants.

Declaration of Competing Interest

The authors declare that they do not have any known competing interest that could have appeared to influence the work reported in this paper

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